

ELECTRONIC BUSINESS TELEPHONE

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of our earlier filed copending U.S. patent application Ser. No. 351,745 entitled "Electronic Business Telephone" filed Apr. 16, 1973, now abandoned.

BACKGROUND OF THE INVENTION

The present invention is a solid state electronic communications terminal which effectively combines telephone, data terminal and arithmetic computation capabilities. The terminal device herein referred to as the Electronic Business Telephone (EBT) transmits and receives both voice and data and includes the local capabilities of storing and displaying telephone numbers or other numeric information and performing arithmetic manipulation of entered data.

The two technologies of telephony and data telecommunications have developed more or less independently up to the present time. The interface between the two areas has been broadened to some extent lately in response to the need for communication of digital data between remote locations over conventional telephone common carrier lines. However, these two technologies have been "adapted" to each other's requirements rather than being truly integrated in the form of a totally new terminal device based on an optimized design approach which serves both functions effectively.

For example, various types of modems or acoustic couplers, such as the Western Electric Type 103A Data Set, marketed under the trademark "Data-Phone" by Bell System, have been developed under pressure from users of computer services in order to provide them with remote access to a central data processing installation through existing communications networks. Another typical device of this nature is shown in U.S. Pat. No. 3,583,554, issued to Le Blang, which discloses a portable numeric display device with is acoustically or electromagnetically coupled to a selective tone generating telephone in order to adapt it to be used as a data terminal. Devices of this type are characterized by the common limitation that they act as an external adjunct to a conventional electromechanical telephone which activates or de-activates the standard electromechanical processes of the telephone.

Similarly in the area of electronic desk calculators, it has been suggested to adapt a conventional calculator to include the capability for entry and dialing of telephone numbers. Such an approach is discussed in generalized terms in British Pat. No. 1,179,585, issued to VEB Elektronische Rechenmaschinen which suggests that a "transmission channel" including a code conversion device be interposed between the keyboard entry register of the calculator and the telephone exchange device.

On the other hand, the telephone industry being considerably older and more firmly committed to existing methods and equipment, due in large part to economic considerations and historical inertia, has not effectively applied newly developed technology in computer systems design and microelectronics to its own customer terminal equipment. The three primary developmental stages of telephone equipment have involved the call placement function and are represented in terms of hardware by the crank telephone,

the rotary dial telephone and the selective tone generating (e.g. Touch-Tone) telephone. The present invention represents the next evolutionary phase, the electronic telephone.

SUMMARY OF THE INVENTION

The present invention represents the first application of the combined technology of computer design and MOS/LSI microelectronics to the area of the basic business telephone unit. The inventive application and implementation of technical know-how developed outside the telephone art characterized by the BCD telephone of the present invention makes possible the optimized design of a totally integrated business communications system. More specifically, the electronic business telephone of the present invention (hereinafter referred to as the EBT) integrates into a single desk-top device a range of functions which achieves a utility level never before possible using common carrier lines.

The basic EBT design provides automatic push-button dialing in both rotary telephone and touch-tone telephone areas. After keyboard entry the number to be dialed is visually displayed in articulated format with spacing between area code, prefix and suffix for predial verification and the number is automatically dialed on actuation of a single key. The displayed telephone number can be entered into a telephone memory register and the memorized number can be recalled on demand for automatic redial. In a Centrex-type PBX/PABX environment the appropriate access digit — e.g. "9" — is automatically impressed onto the telephone number prior to initiation of automatic dialing.

The electronic telephone digital display and the pushbutton keyboard can be utilized to perform arithmetic computations either during telephone conversation or separately when the instrument is not being used for voice communication. Computation results are displayed and partial results can be stored for accumulation. Finally, the EBT instrument functions as a data terminal whereby digital information can be visually verified and exchanged between any two electronic telephone systems, or through proper interfacing from electronic telephone to computer.

The total business communication system contemplated by the present invention combines the basic EBT unit with various peripheral devices which further increase the power and utility of the system. For example, a "Magna-Dialer" unit provides the facility of automatic dialing of telephone numbers magnetically prerecorded on conventional business cards which visually identify the party being called. An automatic call diverter unit allows incoming calls to be diverted to any phone or extension number stored in memory and allows a user to update the stored number from a remote location. Finally, a "multi-memory" repertory dialer provides automatic retrieval of frequently called numbers and entry into the electronic telephone for automatic dialing.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a pictorial representation of a preferred embodiment of the present invention in the form of an electronic business telephone desk-set;

FIG. 1A is an expanded presentation of the keyboard of the desk-set of FIG. 1;

FIG. 2 is an information flow block diagram illustrating the functional subcomponents of the desk-set of FIG. 1 and their logical interrelationship;